Among the important foreign papers which are of some interest to botanists are the following: Two systematic papers by HOUARD[17] in which the author gives descriptions and notes based on the characters of the galls. Docters VAN LEEUWEN-REIJNVAAN[18] continue their very valuable descriptions of the galls of Java, describing 99 species. These descriptions are purely botanical and in most cases the species is not named, but is placed in such genus or family as may be indicated by the external characters of the cecidium. This is therefore merely the record and description of certain types of cecidia found on certain species of plants and becomes an important starting-point for future workers.—MEL T. COOK.

Motile isogametes in the Chytridiales.—KUSANO[19] has demonstrated in *Olpidium Viciae*, a new species parasitic on *Vicia unijuga*, that the free swimming zoospores sometimes conjugate much as in the lower green algae. Similar copulation was reported many years ago by FISCH in *Reesia*, which is closely related to *Olpidium*, but his account has not been generally accepted. KUSANO, however, not only followed the zygote to infection, but traced its cytological history through to the next generation of zoospores. Conjugation, which seems to occur only during the amoeboid intervals between active swarming, appears to be induced by a contact stimulus. There is a slight physiological differentiation among the zoospores in that not all of those which come together appear to have a sexual affinity, although one of such a mismated pair may often fuse with a third which comes into contact with them. Zoospores from old sporangia which have been prevented from discharging by lack of water copulate more freely than those which have recently matured. Conjugated or unconjugated zoospores may infect the host, one giving rise to resting spores, the other to zoosporangia. After encysting on the outside of the host, the young parasite penetrates the cell wall and escapes into the cell, where it is freely carried around by the rotation of the host cytoplasm, until it finally comes to rest near the nucleus. Though naked until nearly mature, it never undergoes amoeboid deformation as in *Reesia* and *Monochytrium*. The zoospores are discharged through very short wartlike exit beaks, of which four or five may develop on a single sporangium, though only one functions.

In its cytology this organism is so similar to *Monochytrium* as to make it evident that the two are very closely related, although in the latter the spores

---

[17] HOUARD, C., Les collections cécidologiques du laboratoire d'entologie du Museum d'Histoire Naturelle de Paris: l'herbier du Dr. Fairmaire. Marcellia **11**:11–46. 1912; and Galles de Mayr et Muller. Marcellia **11**:107–114. 1912.

[18] VAN LEEUWEN-REIJNVAAN, W. DOCTERS and J., Einige gallen aus Java. VI. Marcellia **11**:49–100. 1912.

[19] KUSANO, S., On the life history and cytology of a new *Olpidium* with special reference to the copulation of motile isogametes. Jour. Coll. Agric. Tokyo **4**:141–199. *pls. 15–17. fig. 1.* 1912.

do not conjugate until after infection. The nuclei of the zoosporangium divide during the growth stages by a process of amitosis like that figured by the writer in *Monochytrium*, but in the later reproductive stages they divide by mitosis, recalling conditions in *Synchytrium* and *Chrysophlyctis*. Fusion of the gametic nuclei in the zygote is delayed until the spring of the following year, the resting spores having of course matured in the meantime. Before they conjugate, however, they undergo a very peculiar process of budding by which large amounts of chromatin are extruded into the cytoplasm and central vacuole. The first division of the fusion nucleus appears to represent reduction, after which the nuclei are multiplied rapidly until the old resting spore becomes a zoosporangium very similar to the temporary sporangia.

The demonstration of such a primitive type of sexuality in *Olpidium* would seem to indicate clearly that it and its allies cannot be considered as having degenerated from higher fungi under "the debasing influence of parasitism." On the other hand, the facts so far brought to light do not give a clear indication of the source from which these forms may have come. It is evident, however, that they are polyenergid in contrast with *Synchytrium*, *Woroninella*, and *Chrysophlyctis*, which are essentially monoenergid, becoming coenocytic only during the reproductive period. KUSANO points out that this fact rules out the monoenergid Endosphaeraceae as indicative of the line of descent of *Olpidium*, though not necessarily eliminating the lower Protococcoideae in the region of *Chlamydomonas*. Now that cytological studies of the Archimycetes are beginning to accumulate, it is becoming increasingly evident that they represent not a single phylum, but a conglomeration of heterogeneous forms which have little in common except their apparent simplicity.—ROBERT F. GRIGGS.

Physiological effect of Bordeaux mixture.—Aside from its fungicidal value, Bordeaux mixture has been reported by several investigators to have a physiological action which results in an increased assimilatory activity of sprayed plants. This action has been further investigated by EWERT, who in a former paper reported experiments which indicate that, contrary to the generally accepted opinion, the physiological effect of Bordeaux mixture on the leaves of plants is detrimental. In the present paper EWERT[20] reports the results of an investigation of the effects of Bordeaux mixture on the assimilatory activity of the potato, radish, and bean; and on the sugar content of currants. The experiments with potatoes, radishes, and beans were conducted with plants grown in tanks under controlled conditions, and in soil kept at a constant water content. It was found that almost without exception the yield of tubers, roots, and pods, and of total dry matter was depressed by a covering of

---

[20] EWERT, R., Weitere Studien über die physiologische und fungicide Wirkung der Kupferbrühen bei krautigen Gewächsen und der Johannisbeere. Zeitschr. Pflanzenkrank. **22**:257–285. 1912.